AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (Currently Amended) A fiber-optic pressure sensor~~, in particular suitable for measuring differential pressures and flow rates in oil drill holes,~~ comprising a transducer with a sensor fiber which has at least one fiber Bragg grating, wherein

~~a)~~ the transducer comprises at least one first pressure member for holding a first medium under an all round pressure p_1,

~~b)~~ the transducer comprises at least one second pressure member for holding a second medium under an all round pressure p_2, and

~~c)~~ the transducer is configured for measuring a pressure difference p_1-p_2 by converting the all round pressures p_1, p_2 into a longitudinal elongation or compression of the at least one fiber Bragg grating of the sensor fiber.

2. (Currently Amended) The fiber optic pressure sensor as claimed in claim 1, wherein the transducer is configured for a differential elongation of the fiber Bragg grating induced by the pressure difference p_1-p_2.

3. (Currently Amended) The fiber optic sensor as claimed in claim 1, wherein

~~a)~~ the sensor fiber is mounted between holders ~~and preferably prestressed~~,

~~b)~~ the holders are connected in a force-closed fashion to the pressure members and~~, if appropriate,~~ to supporting members, and

~~c)~~ the pressure members are configured to deflect at least one holder as a function of the pressures p_1, p_2.

4. (Currently Amended) A ~~The~~ fiber optic pressure sensor ~~as claimed in claim 3~~ comprising a transducer with a sensor fiber which has at least one fiber Bragg grating, wherein

the transducer comprises at least one first pressure member for holding a first medium under an all round pressure p_1,

the transducer comprises at least one second pressure member for holding a second medium under an all round pressure p_2,

the transducer is configured for measuring a pressure difference p_1-p_2 by converting the all round pressures p_1, p_2 into a longitudinal elongation or compression of the at least one fiber Bragg grating of the sensor fiber,

the sensor fiber is mounted between holders,

the holders are connected in a force-closed fashion to the pressure members and, optionally, to supporting members,

the pressure members are configured to deflect at least one holder as a function of the pressures p_1, p_2, ~~wherein~~

~~a)~~ exactly two cylindrical pressure members are provided, which are arranged concentrically, in parallel or serially relative to one another,

~~b)~~ the pressure cylinders have the same length L, and

~~c)~~ the holders are fastened on plunger faces of the pressure cylinders.

5. (Currently Amended) The fiber optic sensor as claimed in claim 1, wherein

~~a)~~ the transducer has separate inlets for the media into the pressure members and/or

~~b)~~ a fiber Bragg grating is provided for differential pressure measurement, a fiber Bragg grating is provided for error compensation, and/or a fiber Bragg grating is provided for temperature measurement.

6. (Currently Amended) A ~~The~~ fiber optic pressure sensor ~~as claimed in claim 1~~ comprising a transducer with a sensor fiber which has at least one fiber Bragg grating, wherein

the transducer comprises at least one first pressure member for holding a first medium under an all round pressure p_1,

the transducer comprises at least one second pressure member for holding a second medium under an all round pressure p_2,

the transducer is configured for measuring a pressure difference p_1-p_2 by converting the all round pressures p_1, p_2 into a longitudinal elongation or compression of the at least one fiber Bragg grating of the sensor fiber, ~~wherein~~ and

~~a)~~ a fiber Bragg grating is held between the first and second pressure members for the purpose of differential pressure measurement~~, and~~

~~b) in particular, an error compensation fiber Bragg grating is held between the second and first pressure members in reverse sequence for the purpose of antiphasal change in elongation~~.

7. (Currently Amended) A ~~The~~ fiber optic pressure sensor ~~as claimed in claim 1~~ comprising a transducer with a sensor fiber which has at least one fiber Bragg grating, wherein

the transducer comprises at least one first pressure member for holding a first medium under an all round pressure p_1,

the transducer comprises at least one second pressure member for holding a second medium under an all round pressure p_2,

the transducer is configured for measuring a pressure difference p_1-p_2 by converting the all round pressures p_1, p_2 into a longitudinal elongation or compression of the at least one fiber Bragg grating of the sensor fiber, ~~wherein~~ and

~~a)~~ a fiber Bragg grating is held between a holder, which can be deflected by differential pressure of two pressure members, and a supporting member~~, the holder~~

~~preferably being connected to a common end plate of two serially arranged pressure members and~~

~~b) in particular, an error compensation fiber Bragg grating is held between the supporting member and the holder which can be deflected by differential pressure in reverse sequence for the purpose of antiphasal change in elongation~~.

8. (Currently Amended) A ~~The~~ fiber optic pressure sensor ~~as claimed in claim 1~~ comprising a transducer with a sensor fiber which has at least one fiber Bragg grating, wherein

the transducer comprises at least one first pressure member for holding a first medium under an all round pressure p_1,

the transducer comprises at least one second pressure member for holding a second medium under an all round pressure p_2,

the transducer is configured for measuring a pressure difference p_1-p_2 by converting the all round pressures p_1, p_2 into a longitudinal elongation or compression of the at least one fiber Bragg grating of the sensor fiber, ~~wherein~~

~~a)~~ one fiber Bragg grating each is held between a first pressure member and a supporting member and a second pressure member and a second supporting member, and

~~b)~~ a pressure difference can be determined with the aid of the two fiber Bragg gratings.

9. (Currently Amended) A ~~The~~ fiber optic pressure sensor ~~as claimed in claim 1~~ comprising a transducer with a sensor fiber which has at least one fiber Bragg grating, wherein

the transducer comprises at least one first pressure member for holding a first medium under an all round pressure p_1,

the transducer comprises at least one second pressure member for holding a second medium under an all round pressure p_2,

the transducer is configured for measuring a pressure difference p_1-p_2 by converting the all round pressures p_1, p_2 into a longitudinal elongation or compression of the at least one fiber Bragg grating of the sensor fiber, ~~wherein~~ and

~~a)~~ at least one pressure member and/or at least one supporting member consists of, or is assembled from materials with different coefficients of thermal expansion ~~a_1, a_2~~ α_1, α_2, such that a differential thermal expansion between the holders counteracts a thermally induced displacement of a Bragg wavelength of the sensor fiber~~, and~~

~~b) in particular, a pressure or supporting member is assembled from at least two segments with different coefficients of thermal expansion and prescribable lengths L', L''~~.

10. (Currently Amended) The fiber optic pressure sensor as claimed in claim 1, wherein

~~a)~~ the transducer has pressure-tight fiber bushings for the sensor fiber, and/or

~~b)~~ the transducer has a cavity for a fiber Bragg grating for the purpose of temperature measurement, and/or

~~c)~~ at least one block with a bore for laterally supporting the sensor fiber is provided in the region of a fiber Bragg grating for the purpose of a compression arrangement.

11. (Currently Amended) The fiber optic pressure sensor as claimed in claim 1, wherein a plurality of transducers of different Bragg wavelength ~~λ_B~~ λ_B are optically connected to a broadband light source ~~and, preferably via a fiber coupler to a wavelength-division demultiplexer and a detector plus an electronic measuring system~~.

12. (Currently Amended) Use of a fiber optic differential pressure sensor ~~as claimed in claim 1~~ comprising a transducer with a sensor fiber which has at least one fiber Bragg grating, wherein the transducer comprises at least one first pressure member for holding a first medium under an all round pressure p_1, the transducer comprises at least one second pressure member for holding a second medium under an all round pressure p_2, and the transducer is configured for measuring a pressure difference p_1-p_2 by converting the all round pressures p_1, p_2 into a longitudinal elongation or compression of the at least one fiber Bragg grating of the sensor fiber, wherein ~~a)~~ a flow rate v_1 of a fluid flow is determined from a differential pressure measurement~~, and b) in particular, the differential pressure measurement is carried out at a venturi tube~~.

13. (New) Use of a fiber optic differential pressure sensor as claimed in claim 12, wherein the differential pressure measurement is carried out at a venturi tube.

14. (New) The fiber optic pressure sensor as claimed in claim 3, wherein the sensor fiber is prestressed.

15. (New) The fiber optic pressure sensor as claimed in claim 6, wherein an error compensation fiber Bragg grating is held between the second and first pressure members in reverse sequence for the purpose of antiphasal change in elongation.

16. (New) The fiber optic pressure sensor as claimed in claim 7, wherein the holder is connected to a common end plate of two serially arranged pressure members.

17. (New) The fiber optic pressure sensor as claimed in claim 7, wherein an error compensation fiber Bragg grating is held between the supporting member and the holder which can be deflected by differential pressure in reverse sequence for the purpose of antiphasal change in elongation.

18. (New) The fiber optic pressure sensor as claimed in claim 9, wherein a pressure or supporting member is assembled from at least two segments with different coefficients of thermal expansion and prescribable lengths L', L''.

19. (New) The fiber optic pressure sensor as claimed in claim 1, wherein a plurality of transducers of different Bragg wavelength λ_B are optically connected to a broadband light source and via a fiber coupler to a wavelength-division demultiplexer and a detector plus an electronic measuring system.

20. (New) A fiber optic pressure sensor comprising a transducer with a sensor fiber which has at least one fiber Bragg grating, wherein

the transducer comprises at least one first pressure member for holding a first medium under an all round pressure p_1,

the transducer comprises at least one second pressure member for holding a second medium under an all round pressure p_2,

the transducer is configured for measuring a pressure difference p_1-p_2 by converting the all round pressures p_1, p_2 into a longitudinal elongation or compression of the at least one fiber Bragg grating of the sensor fiber, and

a fiber Bragg grating is provided for differential pressure measurement, and a fiber Bragg grating is provided for error compensation.

21. (New) A fiber optic pressure sensor comprising a transducer with a sensor fiber which has at least one fiber Bragg grating, wherein

the transducer comprises at least one first pressure member for holding a first medium under an all round pressure p_1,

the transducer comprises at least one second pressure member for holding a second medium under an all round pressure p_2,

the transducer is configured for measuring a pressure difference p_1-p_2 by converting the all round pressures p_1, p_2 into a longitudinal elongation or compression of the at least one fiber Bragg grating of the sensor fiber, and

at least one block with a bore for laterally supporting the sensor fiber is provided in the region of a fiber Bragg grating for the purpose of a compression arrangement.